

# NEWSLINE

Published weekly for employees of Lawrence Livermore National Laboratory

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## BlueGene/L retains Top500 ranking

By Don Johnston

NEWSLINE STAFF WRITER

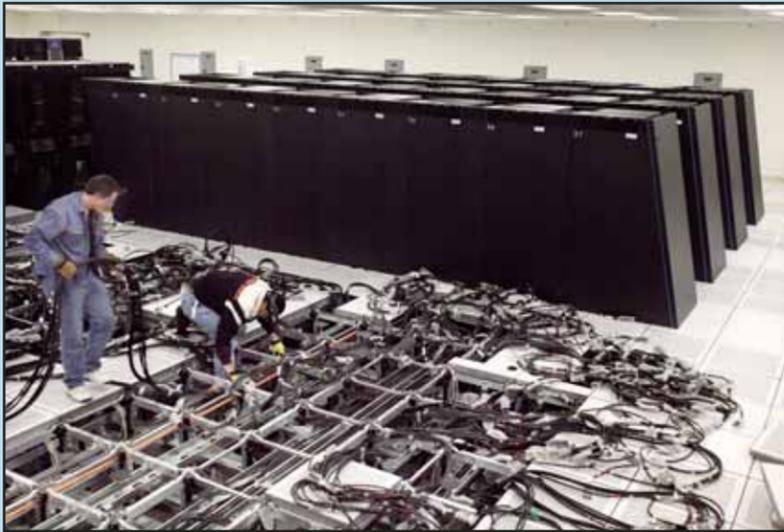
Livermore's Blue Gene/L reaffirmed its ranking as the world's most powerful computer on the Top500 list, the leading industry authority for high-performance computing.

The Top500's new list was announced Wednesday at the 2005 International Supercomputing Conference in Heidelberg, Germany.

IBM's BlueGene/L system, developed in partnership with the National Nuclear Security Administration (NNSA) and the collaboration of LLNL scientists, retained its No. 1 spot on the list with a sustained performance of 136.8 teraflops, trillion floating operations per second, on the industry standard LINPACK benchmark. This machine is the first system to break the 100 teraflop LINPACK barrier.

A BlueGene system at IBM's Thomas J. Watson Research Center in New York was ranked second on the list with a performance of 91.29 teraflops. NASA's Columbia machine

See **COMPUTER**, page 7



JACQUELINE MCBRIDE/NEWSLINE

IBM technicians prepare for the installation of the BlueGene/L supercomputer's remaining racks in the Terascale Simulation Facility, Bldg. 453.

### BlueGene proves a trend-setter

By Don Johnston

NEWSLINE STAFF WRITER

The Advanced Simulation and Computing (ASC) Program's BlueGene/L supercomputer at the Laboratory is an almost perfect example of the "disruptive innovation" that can change the course of a techno-

See **LOUIS**, page 7

## Aurora project enters new phase of effort to develop roadmap for Laboratory's future direction

An offsite campus or a California collaboration to enable easier engagement with the external scientific and business world; a move toward multiple sponsors and partners for varied missions; computer driven discovery that makes the Lab the international center for predictive situational awareness — these are a few of the end states reported at the "Gate II" stage of Aurora, the Lab's vision for 2025.

Members of the five teams — Missions & Sponsors, Science & Technology, Operations & Infrastructure, Partnerships & Relationships and Workforce & Work Environment — met Monday to report on desired goals in each of their areas.

In coming weeks these goals will be "cross-fertilized" and pared into a few key initiatives, which will then be put into action over the next several years to build toward 2012 and 2025 goals for the Laboratory.

"I'm extremely excited about some of the ideas the teams have come up with," said Director Michael Anastasio, who could not attend the report-out but has been keeping track of the project's process. "This is the kind of out-of-the-box thinking we wanted when we formed Aurora."

For two months the Aurora team members have been discussing various end states for their areas, with input from employees via a

See **AURORA**, page 3

## Ellen Eagan-McNeill tapped to lead the Laboratory's operational security program

On Monday Pam Poco, the Operations Security & Program Support Division leader in the Security Department and the associate program leader for Information Security, announced the selection of Ellen Eagan-McNeill as the Laboratory's Operations Security (OPSEC) program manager. She will replace Poco in this role and will assume her new position on July 1.

Poco says Eagan-McNeil has excellent knowledge of the importance of OPSEC in helping the



Ellen Eagan-McNeill

See **OPSEC**, page 4

## Detection inspection

From left: Klaus Ziock of the Lab explains LLNL's mobile radiation detection technology Wednesday to Bruce Miller, senior adviser on National Security Affairs in the Office of the Vice President, Steve Aoki, deputy undersecretary for Counterterrorism and Rhys Williams, program manager for NNSA's Proliferation Detection Program.



JACQUELINE MCBRIDE/NEWSLINE



Got Science? Discover Science this Saturday

— Page 3



Stimulating science appreciation

— Page 5



The basin's acrobats of summer

— Page 8



## LAB COMMUNITY NEWS

### Weekly Calendar

Technical Meeting Calendar, page 4

Saturday  
25

**"Got Science? Discover Science Saturday,"** the Lab's summer science extravaganza for all ages and science interests takes place today from 10 a.m. to 2 p.m. at the Discovery Center (See page 3 for more details).

Monday  
27

The Director's Office will host a **Student Welcome Reception** today at 3 p.m., in Bldg. 123, auditorium. This is an opportunity for summer students to meet Laboratory Deputy Director Wayne Shotts and University Relations Program Director Laura Gilliom. Refreshments will be served. To sign up, go to the Student Bulletin Board at <http://education.llnl.gov/sbb/>

Wednesday  
28

Check out the **weekly barbecue** offered today and every Wednesday from 11:30 a.m. to 1:30 p.m. at the South Café by Java Wave to provide more menu options for students and summer guests housed in the South Mall area. The menu includes a choice of hamburger or hot dog, accompanied by chips, cookie and soft drink, all for \$5.50.

Friday  
1

A representative from **California Casualty Insurance** will be in the Benefits Office today. Appointments are required and may be scheduled by calling 2-9955. California Casualty offers individual rates to Lab employees by payroll deduction for auto and homeowner/renter insurance. As with any employee-paid insurance coverage, employees are encouraged to comparison shop.

...

Applications for **Student-Employee Graduate Research Fellowships (SEGRF)** for UC students are now being accepted through June 30. LLNL, in partnership with the University of California, provides graduate research fellowships for students to carry out research in subjects related to the goals and missions of the Laboratory. This research must be part of the student's pursuit of a Ph.D. degree and must be carried out at LLNL. Fellowships will be awarded on a competitive basis, using the criteria described on the Web at: <http://segrf.llnl.gov>.

### IN MEMORIAM

#### Ernest A. Hartman

Ernest A. Hartman, died on June 16. He was 73.

Hartman was born on Sept. 6, 1931, in New York, where he was raised. He worked as an engineer at LLNL for 35 years before retiring.

In his spare time, he enjoyed photography, traveling and listening to classical music. He also was an active member of the Boy Scouts.

Hartman is survived by his wife of 51 years, Rosemary; son Dan Hartman and fiancée Madonna Ferreira of Livermore; son Robert Hartman and daughter-in-law Kristina Hand of Oakland; sister Nancy Israel and brother-in-law Mort Israel of New York; and grandsons Jake and Joseph Hartman of Patterson.

Services were held.

### The proper disposal of Lab telephone directories

Because of sensitivity regarding names associated with the Laboratory, the Lab's Telephone Directory is not made available to the public. Please remember that the directory should not be given to vendors or left behind in hotel rooms or offsite meetings.

When no longer needed, the recommended disposal method is to remove the directory's spiral binding, and then shred the

pages, or place them in a disposal bin for sensitive or unclassified controlled information. If your facility has not yet obtained

a suitable number of Unclassified Controlled Information cans (formerly referred to as SUI cans), you may dispose of your directory in a WOW box after removing the binding.

Directories should not be disposed of in office waste cans.



### Lab's video series continues with leadership talks

Patrick Lencioni, author of "The Five Dysfunctions of Teams," will speak about leadership and teams on Tuesday, June 28, from 10-11:30 a.m. He will identify the five root causes of frustration caused by office politics and dysfunctional teams and provide solutions to help make any team successful.

On July 21, Robert Cooper, author of "The Other 90 Percent: How to Unlock Your Vast Untapped Potential for Leadership and Life," will speak about new strategies on leadership and employee engagement from 10 - 11:30 a.m. He will use proven research and provide practical leadership tools and management techniques in order to build trust, drive innovation and increase teamwork.

Broadcasts can be viewed on Lab TV, channel 4. Group Viewing in Bldg. 571, room 2301 (sign up when you register) or register for Videos On Demand. Register for these broadcasts at: [http://www-r.llnl.gov/human\\_resources/sedd/eodd/lds\\_lbs.html](http://www-r.llnl.gov/human_resources/sedd/eodd/lds_lbs.html)

#### Leadership Videos On Demand

Access a library of more than 300 programs on leadership and management on your desktop. Register for a free user account by visiting this Website: [http://www-r.llnl.gov/human\\_resources/sedd/eodd/lds](http://www-r.llnl.gov/human_resources/sedd/eodd/lds)

The Leadership Broadcast Series is offered by the Continuing Education Committee and the Employee and Organization Development Division.

#### An Ergonomic Tip



Every 20-30 minutes blink, breathe, break. This will help keep the eyes lubricated, send oxygen throughout the body's tissue, and prevent fatigue.

Advice to keep you safe.  
Visit the Ergonomics Website:  
<http://www.llnl.gov/ergo>



## Newsline

Newsline is published weekly by the Public Affairs Office, Lawrence Livermore National Laboratory (LLNL), for Laboratory employees and retirees.

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Web site: <http://www.llnl.gov/pao/>

## AROUND THE LAB



## Summer institute provides hands-on experience

This year the Lab is holding its fifth Computational Chemistry and Materials Science (CCMS) Summer Institute.

This 10-week institute brings in graduate students who are paired with Lab scientists to work on a variety of research projects. The staff hosts are distributed throughout the Lab in the Chemistry and Materials Science (CMS), Physics and Advanced Technologies (PAT), Biosciences and Engineering directorates.

In addition to their research projects, the students attend a series of lecture courses highlighting the latest techniques in computational materials science.

The institute kicked off earlier this month with a welcome lunch for the students and their hosts. The institute includes eight U.S. students and six for-



JACQUELINE MCBRIDE/NEWSLINE

**This year, 14 students from the United States, Italy, Germany, Ireland, Spain and South Korea are participating in the fifth Computational Chemistry and Materials Science (CCMS) Summer Institute. They are seen here with their staff hosts. The successful 10-week program attracts top graduate students to work alongside Lab scientists on a variety of research projects.**

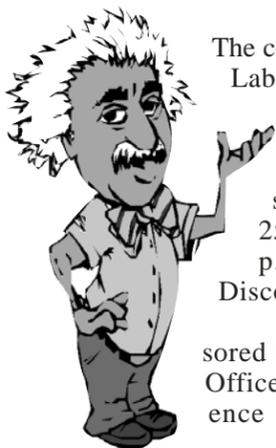
eign nationals from Italy, Germany, Ireland, Spain and South Korea.

This year's CCMS institute is organized by a lab-wide committee representing CMS, Engineering and PAT: Vasily Bulatov, Alison Kubota, Christian Mailhot, Mike McElfresh, Carl Melius, Chris Mundy, Robert Rudd, Eric Schwegler, James Stolken, and Andrew Williamson.

When asked about this year's institute, committee chair Andrew Williamson stated, "From the Lab's standpoint, this is a high profile program that has gained visibility both internally and externally. It's also a good recruitment vehicle for the Lab. The students are some of the best and the brightest and in the past many

have chosen to return to the Laboratory in postdoc and staff positions."

## Laboratory's popular 'Got Science?' event returns



The countdown is on for the Lab's summer science extravaganza, "Got Science? Discover Science Saturday," set for tomorrow, June 25 from 10 a.m. to 2 p.m. at the Lab's Discovery Center.

The event, sponsored by the Public Affairs Office, is geared for science aficionados of all

ages, and promises to be a packed day of science-related activities for families, community members and visitors to showcase the Lab's science and technology.

Experience a wide array of unique displays, demos, and hands-on activities for all ages and scientific tastes. Participate in "Fun with Science" demos, make your own DNA jewelry, watch a robot at work, ride an energy bike, create your own earthquake, and enjoy the tunes of "Scientific Jam."

In the Discovery Center, discover new displays now on loan from the Exploratorium. These hands-on exhibits

will put you in touch with the laws of physics. Get caught up in a tornado, guide a satellite, activate a pendulum snake, and spin a sphere to observe turbulence.

In addition, budding scientists and students can interview roving Lab "mystery scientists" to learn more about their fascinating fields of expertise.

Admission is free. Food will be on sale and continuous shuttle service to and from the parking area will be available.

For more information, call 2-4599 or check the Web at [www.llnl.gov/pao](http://www.llnl.gov/pao).

### AURORA

*Continued from page 1*

special Website, town meetings or from other Aurora teams. As these end states were developed, each team was to address the various strengths, weaknesses, opportunities and threats that would affect each end state and provide metrics that would gauge Lab progress for two milestones, in 2012 and again in 2025. The Gate II reports, held Monday, concentrated on proposed end states for 2012.

Missions & Sponsors came up with end states in three areas — deterrence, global security and resources. One example proposed a national consortium for intelligence and surveillance research and development. The Science & Technology team discussed end states in four current or emerging "pillars of

excellence:" high-energy density physics; high-performance computing; materials science; and biodefense sciences. Operations and Infrastructure proposed strengthening institutional operations through a centrally governed, de-centrally executed infrastructure, and an agile site configuration to accommodate requirements for changes in site use. Partnerships & Relationships identified open-access space for visitors, partners, students and visiting foreign nationals to improve interactions with collaborators, and a "California Collaboratory" with state, university and industry partners to contribute to national security goals. Workforce & Work Environment proposed succession management and knowledge transfer, as well as leadership and management development.

These end states will be studied further for

development into initiatives that will be presented in Aurora's Gate III report-out, a three-day offsite scheduled July 26-28. Employees also are encouraged to submit comments via the Aurora Website, located on the portal, <https://www-r.llnl.gov/>

"Each initiative should make significant advances toward multiple goals," said Cherry Murray, deputy director for Science & Technology and one of the leaders in the Aurora project. "Initiatives should be bold in scope and start a major change in the Laboratory.

"Don't aim for universal buy-in," Murray warned. "If no one is upset, it probably isn't bold enough."

Each initiative should come with metrics for measuring success, a recommended leader and budget requests for FY06.



## NEWS YOU CAN USE

### OPSEC

Continued from page 1

Laboratory's programs protect their sensitive information. Previously she was the NIF Programs

Directorate's Environmental, Safety and Health (ES&H) manager, where she coordinated the program's work activities with facility infrastructure and institutional support. She conducted investigations and independent assessments, and she also served as NIF's

representative on the Lab-wide OPSEC Committee.

Department Head Russ Miller says this appointment helps round out his vision of the Security Department management team that he began reorganizing in December 2003.



## Summer Student Calendar



Seminars, panels and other activities are now in full swing for summer student employees. Go to the Student Bulletin Board at <http://education.llnl.gov/sbb/> for details and to register for events.

**Monday**  
**27**

**Student Welcome Reception**, hosted by the Director's Office. 3 p.m., Bldg. 123 auditorium. This is an opportunity to get acquainted with the Laboratory Deputy

Director and the University Relations Program Director. Refreshments will be served. Contact: Diana Toon, 4-3219.

**Tuesday**  
**28**

**Invited Speaker and Ice Cream Event**, "The Importance of Spin in Sports Ball Performance," by Mont Hubbard, Mechanical and Aeronautical Engineering, UC Davis. 3:30 p.m. Bldg. 361, room 1140, auditorium. Contact: Joanna Allen, 3-9225.

**ICMT Seminar**, "Projective Integration Methods for Multiscale Problems," by Steven Lee, Center

for Applied Scientific Computing (CASC). 2:30 p.m., Bldg. 219, room 163. Contact: Tiffany Ashworth, 4-3491.

**Wednesday**  
**29**

**DHS Seminar**, "Advanced Conflict & Tactical Simulation (ACATS) Overview," by Bob Greenwalt, New Technologies Engineering Division. Noon - 2 p.m., Bldg.

132S, room 1744. Contact: Barry Goldman, 2-5177.

**ICST Seminar**, "Research and Advanced Network Efforts at LLNL," by Dave Wiltzius, Integrated Computing and Communications. Contact: Tiffany Ashworth, 4-3491.

**Thursday**  
**30**

**Radiation Detection Tour**, Simon Labov, PAT Directorate, I Division,

Homeland Security Directorate and Radiation Detection Center. Time to be determined. Bldg. 445 or Bldg. 132. Contact: Barry Goldman, 2-5177.

**HEDP Seminar**, "Intro to Fast Ignition," by Max Tabak, AX Division, 1:30 p.m., Bldg. 219, room 163. Contact: Vickie Stone McFadden, 2-5308.

**Up & Coming**

**Poster training classes** have been scheduled for July 6 at 10 a.m., and July 13 at 10 a.m., with an additional class on July 20, if warranted. Classes will be held in Bldg. 219, room 163. Contact: Kerwin Falls, 2-6098.

Please send your summer student calendar items to [lucchetti1@llnl.gov](mailto:lucchetti1@llnl.gov)

## Technical Meeting Calendar

**Friday**  
**24**

### PHYSICS & ADVANCED TECHNOLOGIES / BIOAEROSOL WORKING GROUP SEMINAR

"Characterization of Recombinant Viruses Using the Integrated Virus Detection System (IVDS) and Small Angle Scattering," by Deborah Kuzmanovic, Edgewood Chemical Biological Center and NIST Center for Neutron Research. 10:30 a.m., Bldg. 151, room 1209, Stevenson Room. Property protection area. Foreign national temporary escorted building access procedures apply. Contact: Matthias Frank, 3-5068.

### CHEMISTRY & MATERIALS SCIENCE/ MATERIALS SCIENCE AND TECHNOLOGY DIVISION

"Surface Chemistry at the Nanoscale," by Fernando Reboledo, H Division. 3:30 p.m., Bldg. 235, Gold Room. Contact: Tom Felner, 2-8012, or Rebecca Browning, 2-5500.

**Monday**  
**27**

### PHYSICS AND ADVANCED TECHNOLOGIES/N DIVISION

"Diagnostics of the Quark Gluon Plasma," by Barbara Jacak, State University of New York, Stony Brook. 10 a.m., Bldg. 235, room 1090. Property protection area. Foreign national temporary escorted building access procedures apply. Contact: Steve Libby, 2-9785.

### CHEMICAL BIOLOGY AND NUCLEAR SCIENCE DIVISION/BIOSECURITY & NANOSCIENCES LABORATORY

"High-resolution Architecture, Function and Environmental Dynamics of Microbial Systems," by Alexander Malkin, Biomaterials Sciences, Molecular Imaging & Nanophotonics Group. 2 p.m., Bldg. 151, Stevenson Room. Foreign nationals may attend if approved plan is on file, which includes Bldg. 151. Contact: Ted Tarasow, 3-7241, or Kathy Ricard, 3-8024.

**Tuesday**  
**28**

### RADIATION DETECTION CENTER

"Computational Guidance in the Search for New Radiation Detector Materials," by Mattias Klintonberg, Lawrence Berkeley National Laboratory. 11 a.m., Bldg. 151, room 1209. Property protection area. Foreign national temporary escorted building access procedures apply. Contact: Christine Shannon, 3-6683, or Ron Wurtz, 3-8504.

### PHYSICS & ADVANCED TECHNOLOGIES/V DIVISION

"Thermodynamics and Melting of Atomic Clusters," by Steven Blundell, Commissariat a l'Energie Atomique (CEA). 2 p.m., Bldg. 319, room 205. Property protection area. Foreign national temporary escorted building access procedures apply. Contact: Stefanie Landes, 2-3201.

**Wednesday**  
**29**

### PHYSICS AND ADVANCED TECHNOLOGIES/N DIVISION

"Development of Femtosecopy: Detailed Source Structure in Relativistic Heavy-ion Collisions Revealed by HBT-imaging Analysis," by Akitomo Enokizono. 10:30 a.m., Bldg. 211, room 227. Foreign nationals may attend if appropriate security plan is on file, which includes Bldg. 211. Property protection area. Foreign national temporary escorted building access procedures apply. Contact: Akotomo Enokizono, 3-8910, or Pat Smith, 2-8210.

**Thursday**  
**30**

### ENGINEERING

Seminar series: Global Energy Security, Renewable Energy, and Roadmap to a Hydrogen Economy — Biomass," by Gunnar Tamm, U.S. Military Academy. 10:30 a.m., Bldg. 543, room 1258. Common use facility. Foreign nationals may attend. Contact: Helen Magann, 2-5229.

### CHEMICAL BIOLOGY & NUCLEAR SCIENCE DIVISION/CHEMISTRY & MATERIALS SCIENCE DIRECTORATE

"Exploiting a Novel Class of Antibacterials to aid Target Discovery and Develop New Antibiotics," by applicant Youn-hi Woo, Oregon State University. 2 p.m., Bldg. 151, room 1209. Foreign nationals may attend if appropriate security plan is on file, which includes Bldg. 151. Contact: Julio Camarero, 2-6807, or Eryn Davis, 2-0475.

## Robert Budnitz receives award for nuclear safety work

Robert Budnitz of the Energy and Environment Directorate recently received the American Nuclear Society's Theos J. "Tommy" Thompson Award for his work in nuclear safety.

He is cited for "his many outstanding contributions toward improving the safety of nuclear power plants and for his leadership and guidance over many years in initiating, promoting, supporting,

and executing numerous programs for the enhancement of nuclear safety worldwide."

Established in 1980 to recognize individuals who have made outstanding contributions to the field of nuclear reactor safety, this award is administered by the Nuclear Installation Safety Division of the American Nuclear Society.

The award is made to an individual who has

provided outstanding wisdom and direction to key elements of the world nuclear safety activities.

Budnitz received the award at the American Nuclear Society meeting held June 5-9 in San Diego.

For more information on the award and list of previous winners, go to <http://www.ans.org/honors/va-thompson>.

## Pacesetter Award recognizes outreach collaboration

By Linda Lucchetti

NEWSLINE STAFF WRITER

Some community outreach projects often sit on the back burner and go unnoticed, while others take time to slowly simmer to success.

T.J. Girill, a TID writer matrixed to Computation and an active member of the East Bay Chapter of the Society for Technical Communication (STC) appreciates slow cooking. That's because, the literacy program he champions, jointly sponsored since 1999 by LLNL's Computation Directorate and the East Bay STC, has just received the 2005 Pacesetter Award from STC.

This year, the international STC board of directors approved the award by a two thirds vote at a meeting in May, and the award was publicly presented at the East Bay STC chapter meeting in early June in San Ramon.

The award reads "In proud recognition of the remarkable literacy outreach program. For six years it has garnered praise and support for delivering excellent education about our craft (technical writing) to high-school students."

The literacy program is offered to multi-ethnic, low achieving 11th grade students at Oakland's Media Academy High School, for-



JACQUELINE MCBRIDE/NEWSLINE

**Oakland's Media Academy students learned how to extract their own DNA while visiting the Edward Teller Education Center in February. The literacy program offers field trips to stimulate science appreciation and stress the relevance of literacy to job success.**

merly Fremont High School. Girill teaches workshops on technical writing, more specifically, introducing writing tools and techniques.

To motivate the students, Girill often pulls from other subject areas, such as science and history, and has even organized several field

trips to the Lab's Discovery Center, to stimulate student appreciation for science and stress the relevance of literacy to job success.

In addition to reaching out to students in Oakland, this year Girill was invited by Livermore's Granada High School Science Department head Frankie Tate to help prepare junior and senior biology students for their project reviews.

"We have totaled just over 2,000 student-hours of in-class literacy development," Girill said.

Girill states that the program encompasses additional Lab partnerships. "Many people have contributed to the success of this literacy effort, including those within the Public Affairs Office, the Science and Technology Education Program, the Edward Teller Education Center, as well as the off-site professional society partner found in the STC. Joining forces is important since promoting partnerships is one of the items on the Director's' A List."

To learn more about the Literacy Project, or how to get involved, go to [www.ebstc.org/newsletter/0105/chptr\\_activities.htm](http://www.ebstc.org/newsletter/0105/chptr_activities.htm) and [www.ebstc.org/newsletter/0505/chptr\\_activities.htm](http://www.ebstc.org/newsletter/0505/chptr_activities.htm).

## Greenville expansion



JACQUELINE MCBRIDE/NEWSLINE

According to the City of Livermore's Website, work continues on the Greenville Road Widening and Union Pacific Railroad Bridge Replacement Project. "The project is currently under construction and is scheduled to be completed in November of 2005." The site directs queries to Harjit Sidhu, project manager at (925) 960-4531. For additional photos and information visit <http://www.ci.livermore.ca.us/eng/roadwork.html#Greenville>.



# CLASSIFIED ADS

See complete classified ad listings at  
<https://www.ais.llnl.gov/newsline/ads/>

## AUTOMOBILES

1987 - Honda Civic CRX Si Coupe - 5 speed/2 door. Red, sun roof and CD player. 138k miles, runs great, good cond. Excellent gas mileage. \$1500/obo. 925-462-6183

2001 - Mazda Tribute DX 4x2 SUV, Silver 5-speed, excellent condition, 89K miles \$7500 OBO. 209-481-7884

1998 - Ford Explorer XLT 4X4, 4dr, PW, PL, Power Seats, Front/rear Air, Leather Seats, AM/FM/CD. 114,000 miles, 1 owner. \$6500 or b/o 925-292-8948

1963 - Dodge Dart GT CONV. Slnt 6, 3 on tree, missing seats, some assy reqd. \$700/b.o. Please call eves. 209-480-4963

1999 - Ford, Explorer, Eddie Bauer, 4 dr, 59,000 miles, great condition. \$12,000 obo 925-989-8059

1995 - Lexus SC300, Dark Blue, Runs Great! Fully Loaded! Just replaced Alternator and Drive Belt. 94K, \$9,900.00/BO. Can be seen here at the lab. 925-373-0751

1995 - Jeep Wrangler, 4 cyl, 4WD, 5-sp, 126k mi, rem hard top, CD, off-rd tires, good cond. \$6,500/BO. 209-599-4754

1992 - Honda Accord EX 4dr, auto, 142K miles, well-maintained, good condition, AC, power everything, \$4000 OBO 510-593-4620

2003 - Honda Accord LX Coupe, 2.4 L, red, 5-speed MT, 34,000 miles, still under warranty. Excellent condition. \$14,700 o.b.o. 510-332-3953

## AUTOMOBILE ACCESSORIES

1993 Z-28 Aluminum heads, front distributor, F.I. and more. Thrown rod. \$250 for heads, some more for the rest. Please call eves. 209-480-4963

Bed Cover, ARE brand, fits 94-02 Dodge 8 ft. bed. \$350.00 or best offer. 925-961-1658

## BICYCLES

Rallye MT sport, 5-speed, 20in wheels, Kids bike, Purple paint near perfect, good tires & seat. \$20.00 925-829-2608

## BOATS

19 ft picklefork and 19 ft flat bottom. Just add engines! Halfway descent. \$500 each with tandem trailers...or part out. Please call eves. 209-480-4963

Two Laser2 sailboats w/sails and trailer. \$3200 or BO. 925-455-4559

## GIVEAWAY

1968 - Karmen Ghia Body in reasonable shape, chassis minus engine. Free to good home, you haul. 925-447-4345

SAND. I have about 30 sandbags. You haul the bags full, return bags empty. 209-833-1201

Fireplace insert. Country Flame woodburning insert with forced-air. Will easily heat a large room. 925-447-4345

Amana window air conditioner for one room. Seems to function properly. Located close to LLNL 925-447-6516

Two used bathroom sinks, white, 15in wide x 10in front/back, 4in centers, self-rimming. very good cond. 925-829-2608

Office Desk; L-shaped Grey Computer Desk - with Monitor platform and keyboard tray; Miscellaneous pots/pans and dinnerware 925-455-5258

Kitchen Cabinets: removed from a recent remodel. Cabinets are sturdy and constructed of 3/4 inch plywood and solid wood, no particle board. 925-449-0427

Free Composite Deck. Roughly 20 ft by 20ft. You disassemble and haul. Call for pictures. 209-483-8719

Gently used Pierre Cardin 4 pc rolling luggage set. Missing 1 zipper pull, slightly worn at 1 corner. Black. 925-516-9510

## HOUSEHOLD

Flooring, glueless laminate 12x12 light-colored tile squares in 4ft sheets. Enough to do about a 10x20 ft area. Some padding incl. You haul. \$100. 209-833-1201

(2) Black Security Doors \$50/ea, Display case \$75/obo, Pinball machine \$65/obo, Soda and Snack machine \$50ea/obo, Gun case \$75/obo. 925-550-3809

Coffee table and 2 end tables, glass tops, very attractive, like new \$150 OBO 925-245-1414

Garage Sale June 25th: 2134 S. Livermore Ave. Kenmore washer/dryer \$275, Mitsubishi TV \$100, Do-it-yourself proctology kit \$25, more. No earlybirds! 925-443-6712

Long twin bed, brass headboard, frame, box spring, mattress \$75, Wrought iron day bed, off white, no mattress \$60 925-447-6221

La-Z-Boy recliner sofa with fold down center backrest with cup holders. Good condition. \$125 or best offer. 925-373-9276

Fireplace screen, gray wrought iron, 31 inch high x 51 1/14 inch wide. Paid \$60. New in unopened box. \$35 925-648-0671

Dishwasher: 6 year old top of the line Kenmore, white. Excellent condition. \$125 OBO 925-449-0427

Solid wood, walnut executive desk, 36" by 72", with plexiglass surface protector. Excellent condition, \$125.00. Jim or Sara. 510-886-3322

Antique Dresser \$100.00 925-426-8452

Canning jars, various sizes. \$10.00. If interested, will bring to work. 510-582-2938

Loft bed, black tubular construction, white formica tiltable desk and shelves underneath, ex cond, great for young student, e-pix available, \$125 925-443-1074

Six assorted decorative Americana collector Plates, artist Wooster Scott, from Danbury Mint. \$20 each or offer for all. 925-308-7251

30 inch GE Electric Cook Top, smooth black glass, manual knob controls on side. Cost was over \$900. Like new. Asking \$100 OBO. 209-833-6452

25cu refrigerator, small chest freezer, clear glass shower doors, 4-drawer file cabinet, make offer 209-983-0190

## LOST & FOUND

One white earring, 1.25 inches diameter, thin metal ring around 925-935-5004

10 Speed - Lost, Relocated at LLNL site? Older light blue bike, bearing my name and Ext. on the center frame bar (2-0431) 925-443-7729

## MISCELLANEOUS

Sofabed frame. You add the futon. Make offer. 925-516-2570

Garage Sale: Saturday 6/25, 8-2:00. Multi-family. 2161 Bluebell Dr. Liv. Flute, Casio keyboard, Longaberger baskets, mens heavy jackets, misc. 925-449-7570

Yard/Moving Sale!!! Everything must go! 1421 Denise Drive, Ripon July 1-2, 8AM - 2PM Bikes, Electronics, Appliances, Clothes, etc. 209-599-6449

Southwest ticket must be used before 8/24/05. Value \$72.10 - Sell \$50.00 925-998-2620 925-998-2620

Computer desks, matching simple design, optional shelf, 40 inches wide, \$20, 24 inches wide \$15 925-447-6221

Easy Bake Oven and snack center for child. Retail \$25+. New in unopened box. \$15 925-648-0671

Industrial Minor Saw, good for detail. Hardly used. Excellent quality. 50.00 OBO 510-582-2938

For The Collector. Eight Star Trek Plates, plus larger Enterprise plate. Original boxes with certificates. Valued over \$1000, make offer. 925-308-7251

Reg. QH 4yr. gelding, grandson of Smart Little Lena. Started on cattle for cutting, best for an experienced rider! \$3900 O.B.O. 209-968-2278

## MOTORCYCLES

2002 - Yamaha YZ85cc good condition. Rider has outgrown. Must sell!! Registration current. \$1700.00 OBO. 925-373-6641

1995 - Suzuki RF600R. Showroom condition, 7,500 miles. Original owner. Always garaged & covered. Incl. tank bag, cover, stand & helmets. \$3,500 Firm. Tracy 209-833-3518

## MUSIC INSTRUMENTS

Acoustic guitar and soft case - great for a beginner. \$50. 209-814-5278. 209-832-3331

Rhodes Mark I stage piano. For that classic sound. Circa 1973, 88 keys, no ampifier, fair condition. \$500 925-417-7593

Korg CX3 Hammond B3 drawbar type keyboard, but smaller, excellent condition \$600 707-350-1815

## PETS & SUPPLIES

Fish tank. 90 Gallon with filters, etc. \$100 or best offer. 925-447-4345

White Fancy Rat free to loving home, good with children. Cage

and food included. 925-998-9861

WANTED, person at NIF buying wire dog cage. I have the top to the cage. Please call x2-0198 or 925-961-1658

Reg. Yrlg. Hereford bull for sale! Great for those spring yrlg. heifers. \$1200 Low birth EPD w/ high milk. 209-968-2278

Free to a good home two fancy ear rats 1 male 1 female also 1 leopard gecko all have cages. 209-574-0939

Rats, 2 younger friendly males need a new home. Complete with cage. Free to any home where they can get more attention. 925-443-7729

## RECREATION EQUIPMENT

Jayco Class C motorhome, 1995, 28', sleeps five, 31K miles, \$30K. 447-5015

35 HP electric start outboard Evinrude. Includes cables, key and gas can. 925-766-8233 Best Offer. 925-516-2570

Poker set, cherry finish wood holder with 4 different color chips (240 total) and 2 decks of cards. Paid \$40. New in unopened box. \$25. 925-648-0671

Portable basketball hoop, very good condition, never used. \$40 925-443-6248

## RIDESHARING

Express your commute, call 2-RIDE for more information or visit <http://www-r.llnl.gov/tsmp>.

Sacramento - Looking for Van/Car pool from Sacramento to Lab. Monday thru Friday. 916-502-5119, ext. 4-4945

## SERVICES

Professional painting and related services. Residential & commercial. Free estimates, Summer specials. 925-487-6643

INTERIOR, EXTERIOR PAINTING ,free estimates. Good time for painting before the weather gets too hot. Excellent workmanship, 25 yrs exp. References. 510-537-7222

Daycare opening. Full time opening in September and one in December. Infant to school age. Near the lab, call Louann, references available. 925-455-5201

Affordable tree service. Trim or remove. 925-443-9941

## SHARED HOUSING

Tracy - Downstairs furnished bedroom and full bath in newer home. Full priviledges. No smoking. \$395 plus deposit plus 1/3 utilities. 209-814-5278 or 209-832-3331

Pleasanton - Furnished/Unfurnished room + private bath in Mohr Park. Lots of privacy with kitchen/laundry priviledges. NS/NP \$600 + 1/2 utilities + deposit. 925-485-3510

Livermore - Room available, nice Condo close to Lab. Female non smoker no pets. Covered parking. \$650 + 1/2 utilities/mo. 925-413-8937

Livermore - 2bed 1bath Private Upstairs Level Avail Asap \$1200/Mo +800 Deposit. Large 3200 Sqft Home W/Pool, Laundry & Bonus Room. 925-570-5771

Dublin - large room with private bath in 4br house, share with another cou-

ple. <1mi to BART/freeway/mall. Includes utility/cable/DSL. \$600. 925-833-1715

## TRUCKS & TRAILERS

1997 - F150 Supercab Lariat, 4.6L, 4X4, All Power, Tow Package, Good rubber, Good Shape 105K miles. \$9250 925-455-8006

1988 - Dutton 22ft boat trailer Single axle Cap 1500 lbs Excellent tires ; a new spare Needs a new home! \$250 OBO 510-547-3474

1986 - Chevy suburban 4x4 lifted big tires good cond. lots of upgrades to motor and tranny.\$4500.00 obo call after 6:00pm 209-574-0939

1999 - Expedition-Eddie Bauer 4WD-5.4L Green, Loaded. 80K miles, great condition. Consider trade for king-cab PU of equal value. \$15,000 OBO 209-667-4310

2002 - 21FT Palamino Travel Trailer. Great Condition. QBed, Electric Full Slide Out Bed/Couch, Full Kitchen and Bath. Asking \$10,500 925-548-1933

1996 - Ford Ranger XLT, extra cab, good running, bedliner,long bed, security system, cassette. 5,290.00 OBO 510-537-7222

1988 - Nomad 5th wheel trailer, 29 foot. Good Condition, \$4500.00 or best offer. 925-961-1658

1996 - NASH 5th wheel, 21.5 ft., exc. condition, \$9,000. 1998 Dodge Ram 2500 truck with 5th wheel hitch, 2 wh. drive, only 36,000 miles, \$14,000. 925-606-7422

1996 - Nomad 5th wheel travel trailer, Fully self contained. Must sell due to illness \$8000 209-756-1811

## VACATION RENTALS

Cozy mountain cabin near Arnold. 4 bedr, 2 bath. Close to hiking, fishing, lakes,streams. Clean, fresh smelling air! Very relaxing and peaceful. 925-245-1114

Soooo cute beach cottage in Santa Cruz near boat harbor. 2 bedr, 2 bath, spa. 4 blks from ocean. Think about fall at the beach! 925-245-1114

Maui, HI - Kahana Reef oceanfront 1BR/1BA condominium. Beautiful two-island view, ocean-side pool, and BBQs. LLNL rates for year-round reservations. 925-449-0761

Squaw Valley - 1 Bedroom ski in/out 5-star condo sleeps 4. Dec. 25-Jan. 1 OR Jan. 1 - 8. \$1000/week or \$200/night (3 night minimum), including all fees. 925-240-5930

Maui, Wailea Ekahi, 1 bedroom, 2 bath, luxury condo, tropical beach resort. Discount July 2-12 209-478-0340

## WANTED

Teenager for babysitting in our home (two eight year olds) on occasional Friday or Saturday evenings. Sunset area in Livermore. 449-7525

Smaller outboard motor (5-20 H.P.) Want to use as backup for older Sears runabout. Up to \$800. 209-892-1918

Pre-owned AT&T cell phone, GSM 850/1900 Mhz, 209-832-8945

We are looking for a small condo to rent in Honolulu for 2. Low rate for Dec. 24 to Jan 14. 510-537-7222

## LOUIS

Continued from page 1

logical domain such as high performance computing, according to Steve Louis, Integrated Computing and Communications (ICCD) assistant department head.

This was one of the messages Louis, and Alan Gara, chief system architect of BlueGene/L (BG/L) for IBM, delivered Thursday in a keynote presentation, "Peta-scale Computing During Disruptive Times," at the International Supercomputer Conference in Heidelberg, Germany. On Wednesday, the new Top500 list of the world's fastest supercomputers was released with BlueGene/L reaffirming its No. 1 ranking (see accompanying story).

"Disruptive innovation" is a term made popular by Clayton Christensen of the Harvard Business School, and refers to change brought to markets by the introduction of new products or technologies that are markedly different from existing ones, Louis said. Development of these products is driven by a pressing need — not met by existing technology — for simpler, cost-effective solutions. Such has been the case for high performance computing as it looks to progress to the next level.

The National Nuclear Security Administration's ASC program has such a need to fulfill its mission to ensure the safety, security and reliability of the nation's nuclear deterrent without testing — stockpile stewardship, Louis said. "We recognized that to take the next step from teraflops (trillions of floating point operations per second) to petaflops (1,000 trillion floating point operations per second) would require fundamental



From left: Steve Louis of the Laboratory receives the first place certificate for BlueGene/L from Erich Strohmaier of the Top500 in Heidelberg, Germany on Wednesday.

change in the way high performance systems are designed and managed."

A first result was BG/L, a collaborative effort between IBM research and Laboratory scientists from the tri-lab ASC program. BG/L is "worlds apart" from other high performance computers in performance, size, appearance and design, said Louis, who is helping scientists from the three labs get early access for "first wave applications."

BG/L employs unique components, such as IBM's systems-on-a-chip technology, and offers unusual features, such as three different ways to interconnect computer nodes for applications instead of the usual one, Louis said. "The basic principles that drove the design of this highly scalable system were: 'keep it simple' and a 'divide and conquer' approach to software scale-up."

Though BG/L is currently at only half its full configuration, early "first wave" scientific applications are yielding promising and programmatic

cally relevant results, Louis reports. "The machine is working very well, and the code teams are jostling to get time allocations on it."

Scientists in the ASC program from Los Alamos and Sandia also have put codes on BG/L, he said. "This is a tri-lab effort and we've put codes from all three labs on the machine in an effort to share the advantages this new platform provides.

"We're achieving some important early results," Louis said, noting recent simulations with unprecedented detail of pressure-induced solidification of tantalum at high temperatures and pressures — calculations that provided critical new understanding to the process.

"We're enabling great science for a targeted group of applications that are very important to NNSA's stockpile stewardship program, including problems in classical and first-principles molecular dynamics, instability and turbulence, and 3-D dislocation dynamics" he added.

There's also a high level of international interest in BG/L, particularly in Europe, Louis said. "It's clear that BG/L is becoming a trend-setter."

Last week, IBM announced the launch of the Watson Blue Gene (BGW) system at its T. J. Watson Research Center in Yorktown Heights, N.Y. Another Blue Gene machine is slated for Argonne National Laboratory. In Europe, the University of Edinburgh and the Dutch astronomy group ASTRON also have ordered machines.

The success of BG/L is helping to drive change in the triad of "simulation, theory and experiment" and "promises to revolutionize high-end scientific computing," Louis said. "Linpack numbers and Top500 lists are certainly exciting news, but applications results are what the excitement is all about. These applications are enabling revolutionary science and opening a cost-effective path to petaFLOP computing."

## COMPUTER

Continued from page 1

was ranked third, Japan's Earth Simulator fourth and Barcelona's Mare Nostrum fifth. The Laboratory's Thunder machine is seventh on the list, with a sustained performance of 19.94 teraflops.

Housed in the recently completed Terascale Simulation Facility, Bldg. 453, BlueGene/L is currently at 32 racks, or half its final configuration of 64 racks. Delivery of the final racks and installation will be completed this summer. But work is well under way in bringing the machine to production and researchers are conducting "first wave" science applications (see accompanying article).

"Even as we are bringing the machine to its full configuration, we are doing science critical to NNSA's mission to ensure the safety, security and reliability of the nation's nuclear weapons stockpile. This represents a great team effort led by NNSA's Advanced Simulation and Computing program," said Dona Crawford, associate director for Computation. "Working with our partners at IBM, Los Alamos and Sandia, we are simultaneously advancing scientific discovery and the high-performance computing that makes it possible. The capabilities we are now beginning to apply to our national security missions also will be applicable in other domains."

"The Blue Gene architecture will run certain problems at tremendous speeds, 10 times faster than previously possible," said Dimitri Kusnezov, director of the NNSA ASC program. Once complete, the National Nuclear Security Administration will have available the kind of national security tool needed to rapidly analyze urgent nuclear weapons stockpile aging issues. It will support broader simulation codes to support certification of our stockpile."

"Looking at the Top500 list we notice that five of

the top 10 systems on the list are BG/L machines. In addition, the scientific results being obtained from BG/L at Livermore are breathtaking. It's very gratifying to be a part of the highly successful ASC partnership with IBM that developed a system that has revolutionized high performance computing. This continues a long standing Livermore tradition of pioneering scientific computing," said Mark Seager, Computation's leader for Advanced Technologies.

"The key question we're seeking to answer in stockpile stewardship is what happens to nuclear weapons and their components as they age far beyond their original design life. To ensure the safety and reliability of the nation's nuclear deterrent, we need to be able to predict how weapons materials will age and how aging will affect performance," Seager said. "With BlueGene/L, we can do predictive simulation. We are now developing the computational capability that will allow us to tightly couple simulation with theory and experiment. This is a very exciting time to be at Livermore."

Mike McCoy, program leader for ASC, said the Livermore Computing and CASC computer scientists, who collaborated in the design reviews and are currently working with IBM to install and integrate the machine, have been a critical part of the BGL success story.

"This is the first machine of its kind. Mark Seager played a key role in influencing the design through extensive design reviews and complex functionality negotiations. He continues to lead the effort to bring the machine to full configuration and to influence the design of the next generation machine (BlueGene/P)," McCoy said. "Kim Cupps and her integration team deserve a great deal of credit for keeping BG/L on track

in the face of the technical challenges that are an inevitable part of bringing a serial No. 1 system to fruition. Moe Jette, Don Lipari and their teams have been instrumental in writing brilliantly designed open source job launch and scheduling software necessary for a functional multi-user environment."

In announcing the new list, Top500 officials noted that the pace of innovation and performance improvements seen

at the very high end of scientific computing shows no sign of slowing down. Half of the top 10 systems on the November 2004 Top500 list were displaced by newly installed systems and the last 201 systems on the list from last November are now too small to be listed any longer.

IBM BlueGene servers across the world now occupy four of the top 10 slots on the Top500 list. LLNL is home to two of the top 10 supercomputers and seven of the top 50.

Steve Louis, assistant department head for Integrated Computing and Communications, accepted the Top500 first place certificate for the Laboratory at the Heidelberg ceremony. Louis, who has been helping scientists get access to BlueGene/L with "first wave applications," co-delivered the keynote address at the conference Thursday with Alan Gara, chief system architect of BG/L for IBM.

The Top500 list is compiled by Hans Meuer of the University of Mannheim, Germany; Erich Strohmaier and Horst Simon of the National Energy Research Supercomputing Center at Lawrence Berkeley National Laboratory; and Jack Dongarra of the University of Tennessee, Knoxville.

To see the complete list or for more information, see the Top500 Website: <http://www.top500.org/>.



# Basin aerial acrobats: dragonflies and damselflies

While walking around the small, aquatic basin near the Central Cafeteria, it's easy to miss the graceful, speedy movements of a myriad of dragonflies and damselflies. Yet, with some heightened vigilance, one of the Lab's smallest inhabitants is within eyesight. Startlingly intricate designs, vibrant colors, and awesome acrobatic moves reward the keenly focused eye.

## California diversity

Both dragonflies and damselflies comprise the insect order known as *Odonata* (meaning toothed jaw), although dragonflies belong to the suborder *Anisoptera* (unequal-winged) and damselflies to the suborder *Zygoptera* (yoke-winged). California is home to more than 60 of the over 5000 extant species of dragonflies and damselfies; yet, these 60 species represent all seven families that occur across the U.S.

## Dragonfly, damselfly differentiation

At the basin's edge, these aerial artists are commonly found; yet, is it a dragonfly or a damselfly? A simple way to distinguish one from the other is to compare the two while at rest. The dragonfly will keep its wings out flat, while the damselfly will hold its wings over its abdomen. The larvae of both species are strictly aquatic, damselflies have featherlike gills at the end of their abdomen; dragonflies don't. Other variables also differentiate the two insect groups. The heavier bodied, larger, and stronger fliers typically are dragonflies; while damselflies are smaller, more slender, and weaker fliers. Despite their differences, both insects are commonly and collectively referred to as dragonflies.

## Tandem courting

It's not unusual to catch a glimpse of a dragonfly pair clutched together in flight above the water's surface. This unique and complex ritual offers a fascinating glimpse into their breeding behavior. Surprisingly, even insects are territorial and males may defend an area in anticipation of mating with a female (often termed resource defense territoriality). Males may also gather together — perched in vegetation — awaiting females or actively scout for their partner by flying up and down the water's edge or within the adjacent vegetation. Although females spend much time



By Jessie Coty



Although a number of species occur at the basin, two species commonly seen include the (above) flame skimmer dragonfly (*Libellula saturata*) and (top right) the bluet damselfly (*Enallagma civile*). The dragonfly flame skimmer is a large species (52-61 mm in length; wingspan of 85-95 mm) that is active aerially from April to November. As the photo demonstrates, its vibrant red-orange coloration makes it easy to identify. The familiar bluet is smaller (25-35 mm in length). This species may be seen tandem ovipositing on plants that float at the surface (active aerially from March through November). Lower right: A mating embrace.

away from water, they return for mating.

Upon finding their mating match, the dragonflies fly in a tandem pair to a perch. This tandem consists of the male clasping the female by the head and flying with the male in front and the female following. If lucky, you'll then see the mating "wheel" formation (see photo), in which the female bends her abdomen forward and downward to connect with the male's genitalia for an equally complex sperm transfer to occur. Mating may last in this position for several seconds to hours (species specific). The subsequent egg

laying (ovipositing) may occur with the male and female remaining in tandem, with the male hovering over the female, or by the female alone. The basin provides frequent opportunities to spot females hovering over the water surface and repeatedly dipping into the water's surface with their abdomen to oviposit.

## Hatching and hunting

The period at the end of this sentence is about the size of most dragonfly eggs; hatching occurs weeks later. Unlike most helpless bird hatchlings, dragonfly parents do not fend for nor feed the larvae (nymphs) that emerge from these minute eggs. Yet, dragonfly larvae are precocious aquatic predators. Not fussy eaters, their underwater crawling results in opportunistic stalking, hunting, and ambushing of prey, eating any animal their size or smaller. Even a sizeable meal of small vertebrates like tadpoles, fish fry, or other dragonfly larvae may make up this random menu. Similar to birds, the larvae undergo molting (or "instars") and will molt about a dozen times over the months or years needed before crawling out of the water to emerge as an adult. The larvae undergo direct metamorphosis to their adult life stage.

## Metamorphosis: a brief adulthood

Seemingly out of a horror movie, metamorphosis is spellbinding (see photo sequence). Once perched (perhaps on a branch or rock) out of the water, the "skin" over the larva's thorax cracks and the adult, winged dragonfly slowly emerges out of this broken shell. Over a matter of hours, its legs harden, body and wings expand, mature and harden, and colors fully develop. A glassy sheen to the wings indicates a new ("teneral") adult. The new adult is then mobile.

Their showy designs and colors, belie attributes that go far beyond their shell-deep beauty. Adults use their keen eyesight and quick aerobic agility to hunt their insect prey. Although flight speeds may reach up to 25-30 mph, average cruising speeds for basin species are nearer to 10 mph. Adult dragonflies tend to have a short lifespan (weeks to months). This brief aerial adulthood allows for feeding, maturation, and mating. Similar to migratory birds, a few dragonfly species may disperse over great distances, even across oceans. However, many more remain closely tied to their larval habitats (site fidelity).

## Folklore aside

Some believe that these "toothed jaw" or serrated jawed insects may sting or bite humans, but this is merely a tale. Yet adult dragonflies are fearsome predators to other insects. These aerial predators with voracious appetites provide the benefit of keeping pest insects in check (for example, gnats and mosquitoes). Conversely, dragonflies constitute a key part of the basin's amphibians' diets, like the federally threatened California red-legged frog (*Rana aurora draytonii*).

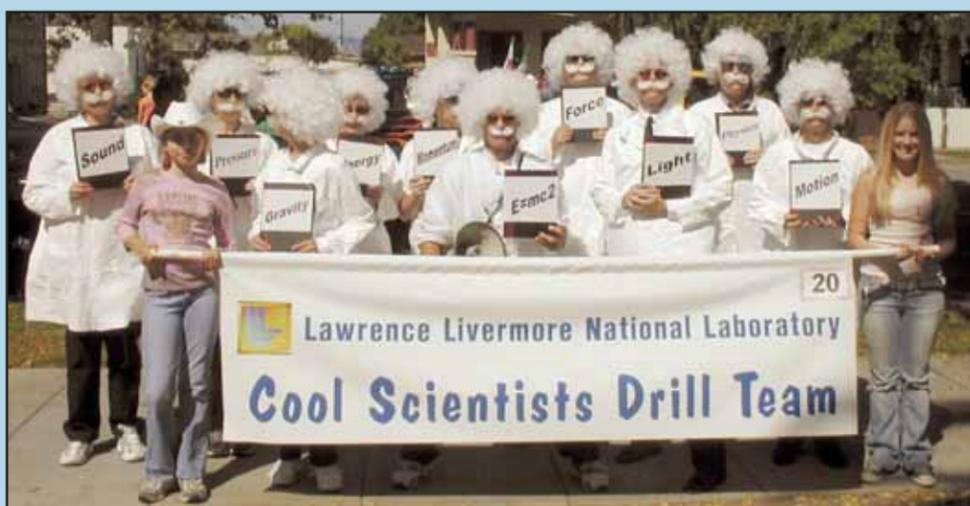
To enjoy more articles about LLNL's wildside, please visit [http://www-envirinfo.llnl.gov/wildside\\_articles.html](http://www-envirinfo.llnl.gov/wildside_articles.html)



JAMES L. LASSWELL, TEXAS A&M UNIVERSITY

Metamorphosis from larva to adult (Widow skimmer, *Libellula luctuosa*): 1) larva thorax splits, 2) adult begins to metamorphose, and 3) newly emerged adult.

## Einsteins on parade



SCOTT WILSON/PAO

Members of the Laboratory's Cool Scientists Drill Team marched in Livermore's Rodeo Parade June 11.



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